

10/520995



INVESTOR IN PEOPLE

**PRIORITY
DOCUMENT**SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

REC'D 09 SEP 2003

WIPO

PCT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

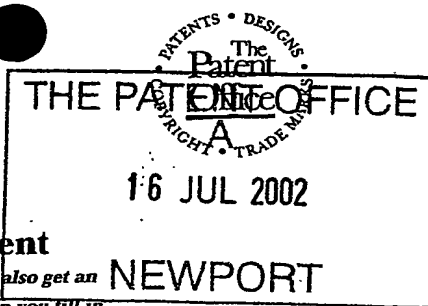
Signed

Dated 20 August 2003

BEST AVAILABLE COPY

Patents Form 1/77

Patents Act 1977
(Rule 16)



1/77

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference P31495-/MGO/JDB

2. Patent application number

(The Patent Office will fill in this)

16 JUL 2002

3. Full 0216448.1
each (underline all surnames)

Mr Graham McLeish
Woolmill Croft
Ardlethen
Ellon
AB41 8JE

16JUL02 E733612-1 002884
P01/7700 0.00-0216448.1

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

8425779001

4. Title of the invention "Connector"

5. Name of your agent (if you have one)

Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Scotland House
165-169 Scotland Street
Glasgow
G5 8PL

Patents ADP number (if you know it)

1198015

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

No

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

20

Claim(s)

Abstract

Drawing(s)

12

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature *Murgitroyd & Company*
Murgitroyd & Company

Date
15 July 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Craig Watson

01224 706616

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

1 **Connector**

2

3 This invention relates to an electrical connector,
4 particularly but not exclusively for use in
5 difficult to and/or out of reach locations.

6

7 Electrical connectors are used in a variety of
8 domestic and industrial Applications. A number of
9 different connectors are known and these vary from
10 application to application, a 3-pin plug and wall
11 socket is a typical example.

12

13 There are two popular types of connector for
14 connecting light bulbs to a socket; a thread
15 connection and a bayonet connection. For the thread
16 connection, the bulb thread is rotationally aligned
17 with a thread of the socket and then screwed into
18 the socket allowing respective electric terminals on
19 the bulb and socket to connect.

20

21 The bayonet connection has pins which extend
22 radially from the bulb. The pins are aligned with
23 apertures in a circumferentially extending rim of

1 the socket and inserted therethrough against action
2 of a spring in the socket and so to allow respective
3 terminals on the bulb and socket to electrically
4 connect. The bulb is then turned so that the pins
5 move into small recesses in the rim and are no
6 longer aligned with the apertures. The action of
7 the spring engages the pins with an edge of the
8 recesses to hold the bulb in the socket and maintain
9 the electrical connection.

10

11 Although these connectors are generally competent,
12 they can be difficult to secure and release,
13 particularly in out of reach places such as sockets
14 suspended from the ceiling.

15

16 A connector for a cordless kettle is described in
17 US5971810 the disclosure of which is incorporated
18 herein by reference. This connector, shown in Figs.
19 1a - 1c allow the connection between a male part 20
20 and female part 50 of the connector regardless of
21 relative rotational orientation.

22

23 According to the present invention there is provided
24 an electrical connector comprising a male part and a
25 female part for engagement therewith;

26 the male part comprising a first terminal
27 having a circular cross section and a second
28 terminal;

29 the female part comprising engaging means to
30 engage said terminals;

1 wherein the male and female parts each comprise a
2 magnetic portion adapted to attract the parts
3 together to form an electrical connection.

4
5 Preferably, the first and second terminals are
6 concentric.

7
8 Preferably, the second terminal is a pin terminal.
9 Preferably, the second terminal has a circular cross
10 section. Preferably, the first terminal is an
11 annular terminal.

12
13 Preferably, the male or female part is attached to
14 pendent means, more preferably, the female part is
15 attached to the pendent means.

16
17 Preferably, the parts can engage with each other in
18 any relative rotational orientation.

19
20 Preferably, the magnetic portions have a circular
21 cross section, and are preferably in the form of an
22 annular ring.

23
24 Preferably, the terminals are male terminals.

25
26 Preferably, the first terminal is a neutral terminal
27 and the second terminal is a live terminal.

28
29 The engaging means of the female part may comprise
30 female terminals.

31

1 Optionally a male earth terminal may be provided.
2 Preferably, the earth terminal has a circular cross
3 section and is concentric with the first and second
4 terminals. The corresponding female earth terminal
5 may extend through a circumferentially projecting
6 portion of the female part.

7
8 Preferably, the male terminals are adapted to engage
9 with the engaging means so that in use, the earth
10 connection is the first to be made, then the neutral
11 connection and lastly the live connection.

12
13 Preferably, the male terminals are adapted to
14 disengage with the engaging means in the order: live
15 first, neutral second, earth last.

16
17 Preferably, the female live and neutral terminals
18 comprise a means to reduce the possibility of arcing
19 during connection and disconnection; for example the
20 female terminals may be coated with silver or silver
21 pads.

22
23 Preferably, the female terminals are resilient in
24 order to maintain a good connection with the
25 corresponding male terminals.

26
27 Preferably, the magnetic portions comprise rare-
28 earth permanent magnets such as a NdFeB (neodymium-
29 iron-boron) magnets.

30
31 Preferably, the strength of the magnet is sufficient
32 to attract the parts of the connector together. For

1 example, where at least one part of the connector is
2 connected to the pendent means and the other part of
3 the connector is brought within 8cm of the first
4 part, the parts will preferably attract each other,
5 and move towards each other and connect. Optionally,
6 even stronger magnets may be used so that the parts
7 can attract each other at distances of 12-15cm.

8
9 The strength grade may be 30 although other grades
10 may be used. The magnetic portions may be exposed
11 on the outside of the parts or may be provided
12 within a body of the parts.

13
14 The connector may be used to connect electrical
15 appliances to mains electrical supplies.
16 Alternatively one part of the connector may further
17 comprise a standard bulb fitting at one end, such as
18 a screw or bayonet, so that a bulb can be placed in
19 that one part before the connection is made, thus
20 allowing easier connection of the bulb to a
21 difficult to reach or out of reach socket since the
22 parts attract one another.

23
24 Embodiments of the present invention will now be
25 described by way of example only with reference to
26 the accompanying drawings wherein-

27 Fig. 1a is an upper perspective view of a known
28 connector in its disconnected position;
29 Fig. 1b is a lower perspective view of the
30 known connector of Fig. 1a;

1 Fig. 1c is an upper perspective view of the
2 known connector of Fig. 1a but in its connected
3 position;
4 Fig. 2a is a side view of a first embodiment of
5 a connector in accordance with the present
6 invention, in a disconnected position with an
7 attached light bulb;
8 Fig. 2b is a plan view of a female part of the
9 connector of Fig. 2a;
10 Fig. 2c is a plan view of a male part of the
11 connector of Fig. 2a;
12 Fig. 2d is a partially cut-away perspective
13 view of the female part of Fig. 2b;
14 Fig. 2e is a partially cut-away perspective
15 view of the male part of Fig. 2c;
16 Fig. 2f is a perspective view of the female
17 part of Fig. 2b;
18 Fig. 2g is a perspective view of the male part
19 of Fig. 2c;
20 Fig. 3 is a side view of the connector of Fig.
21 2a but in its connected position;
22 Fig. 4a is a side sectional view of a second
23 embodiment of a connector in accordance with
24 the present invention;
25 Fig. 4b is a side view of the connector of Fig.
26 4a;
27 Fig. 4c is a plan view of a female part of the
28 connector of Fig. 4b;
29 Fig. 4d is a plan view of a male part of the
30 connector of Fig. 4b;
31 Fig. 5a is a perspective view of the female
32 part of Fig. 4c;

1 Fig. 5b is a perspective view of the male part
2 of Fig. 4d;
3 Fig. 5c is a second perspective view of the
4 male part of Fig. 4d with a portion cut away;
5 Fig. 6a is a side view of a third embodiment of
6 a connector in accordance with the present
7 invention, in its disconnected position with an
8 attached light bulb;
9 Fig. 6b is a plan view of a female part of the
10 connector of Fig. 6a;
11 Fig. 6c is a perspective view of the female
12 part of Fig. 6b;
13 Fig. 6d is a partially cut away perspective
14 view of the female part of Fig. 6b;
15 Fig. 6e is a partially cut away perspective
16 view of a male part of the connector of Fig.
17 6a;
18 Fig. 6f is a perspective view of the male part
19 of Fig. 6e;
20 Fig. 6g is a plan view of the male part of Fig.
21 6e;
22 Fig. 7 is a side view of the connector of Fig.
23 6a but in its connected position;
24 Fig. 8 is a perspective view of the connector
25 of Fig. 6a with an attached light bulb;
26 Fig. 9a is a side sectional view of a fourth
27 embodiment of a connector in accordance with
28 the present invention, in its disconnected
29 position;
30 Fig. 9b is a side view of the connector of Fig.
31 9a;

1 Fig. 9c is a plan view of a female part of the
2 connector of Fig. 9b;
3 Fig. 9d is a plan view of a male part of the
4 connector of Fig. 9b;
5 Fig. 10 is a side sectional view of the
6 connector of Fig. 9a but in its connected
7 position;
8 Fig. 11 is a side sectional view of the
9 connector of Fig. 9a showing magnetic
10 attraction between the male and female parts;
11 Fig. 12a is a perspective view of the female
12 part of Fig. 9c;
13 Fig. 12b is a partially cut away perspective
14 view of the female part of Fig. 9c;
15 Fig. 12c is a second partially cut away view of
16 the female part of Fig. 9c;
17 Fig. 12d is a partially cut away perspective
18 view of the male part of Fig. 9d;
19 Fig. 12e is a perspective view of the male part
20 of Fig. 9d;
21 Fig. 12f is a second partially cut away view of
22 the male part of Fig. 9d;
23 Fig. 13 is an enlarged view of the female part
24 of the connector of Fig. 12c.
25
26 A known connector 10 is shown in Figs. 1a-1c and is
27 disclosed in more detail in US 5,971,810 the
28 disclosure of which is incorporated herein by
29 reference. The connector 10 comprises a male part
30 20 adapted to mate and form an electrical connection
31 with a female part 50. The male part 20 comprises a
32 live central pin terminal 21, and first neutral 22

1 and second earth 23 annular terminals. The female
2 part comprises a boss 63 which projects from a body
3 60 of the female part 50, a central aperture 61 for
4 receiving the pin terminal 21 and an annular recess
5 62 for receiving the annular terminal 22 of the male
6 part 20. When connected, as shown in Fig. 1c, the
7 second annular terminal 23 of the male part 20
8 locates around the boss 63 and live and neutral
9 female terminals 51, 52 are located within the
10 central aperture 61 and annular recess 62
11 respectively for electrical connection with the
12 corresponding male terminals 21, 22. An earth
13 terminal 53 is provided through a side wall 64 of
14 the boss 63 to connect with the annular earth
15 terminal 23 of the male part 20. All male and female
16 terminals 21-23, 51-53 are attached to spade
17 connectors 31-33, 71-73 respectively and in turn to
18 electrical appliances or powers sources (not shown).

19
20 A first embodiment of a connector 100 in accordance
21 with the present invention is shown in Fig. 2a. The
22 connector 100 comprises a male part 120 adapted to
23 mate and form an electrical connection with a female
24 part 150. A light bulb 101 is attached to the male
25 part 120 at the opposite end of the connection with
26 the female part 150 by any known means, in this
27 embodiment, by a bayonet fitting 102, and can be
28 removed and replaced when required by such known
29 means. The male part 120, shown in plan view in
30 Fig. 2c, comprises a body 130 having a central pin
31 terminal 121, and first 122 and second annular

1 terminals 123. The three terminals 121-123 are
2 concentric.

3

4 In this embodiment the pin terminal 121 of the male
5 part 120 is connected to a live terminal 127 of the
6 standard connector 102 by wire 124 and the first and
7 second annular terminals 122, 123 to neutral 128 and
8 earth 129 terminals of the connector 102
9 respectively, also by wire 125, 126. It will be
10 appreciated that some light fittings do not have
11 earth connections and so their inclusion is
12 optional.

13

14 The female part 150 is suspended from a ceiling (not
15 shown) by a pendent or cable 103 and secured to the
16 cable 103 by a cable clamp 104. The female part
17 comprises a boss 163 which projects from a body 160,
18 a central aperture 161 for receiving the pin
19 terminal 121 and an annular recess 162 for receiving
20 the annular terminal 122 of the male part 120. When
21 connected, as shown in Fig. 3, the second annular
22 terminal 123 of the male part 120 locates around the
23 boss 163. Female terminals 151, 152 are located
24 within the central aperture 161 and annular recess
25 162 for electrical connection with the corresponding
26 male terminals 121, 122. An earth terminal 153 is
27 provided through a side wall 164 of the boss 163 to
28 connect with the earth terminal 123 of the male part
29 120.

30

31 The terminals in the female part 150 are spring
32 loaded to maintain the connection between the

1 respective male and female terminals and adapted so
2 that a connection forms between the respective earth
3 terminals 123, 153 then between the neutral
4 terminals and then between the live terminals when
5 the male 120 and female 150 parts are connected.
6 Conversely, when the connection between the male 120
7 and female 150 parts is broken, the live terminals
8 121, 151 are adapted to disengage first, then the
9 neutral terminals 122, 152 and lastly the earth
10 terminals 123, 153. This ensures that sparking or
11 arcing is minimised during connection and
12 disconnection of the parts of the connector so that
13 it is safe to use. Also, the male live and neutral
14 connections are surrounded by the earth terminal 123
15 which reduces the possibility of electrocution when
16 connected. The live 151 and neutral 152 terminals
17 of the female part 150 are also safely recessed in
18 line with safety regulations. In order to further
19 reduce the possibility of arcing during
20 connection/disconnection of the parts 120, 150; the
21 live 151 and neutral 152 terminal of the female part
22 150 are coated with silver pads.

23

24 A magnetic ring 135 is secured by spring clips (not
25 shown) or any other suitable means to the male part
26 120 between the second annular terminal 122 and the
27 earth terminal 123. An oppositely attracting
28 magnetic ring 165 is secured between the annular
29 recess 162 and an edge 166 of the boss 163 of the
30 female part 150, as shown in Fig. 2f. A suitable
31 heat resistant glue may also be used to secure the

1 magnetic rings 135, 165 to the parts 120, 150
2 although this is less preferred.

3
4 In this embodiment the magnetic rings are annular
5 rings and around 1.5mm thick and have an outer
6 diameter of 27mm and a central aperture of diameter
7 15mm although it will be appreciated that a variety
8 of sizes may be used. A further embodiment has a
9 diameter of 28mm and a central aperture of 16mm for
10 the female part 150. The magnetic rings 135, 165
11 are powerful enough to attract the parts 120, 150 of
12 the connector 100 at a distance of up to 8cm. For
13 stronger magnetic rings, the parts may attract each
14 other at a distance of up to 12-15cm. However there
15 is a balance between proximity of location and ease
16 of separation for different embodiments - extremely
17 strong magnetic rings that locate one another over
18 8cm apart would be difficult to separate when
19 required. On the other hand, weak magnetic rings
20 which are easier to separate would require the parts
21 120, 150 to be offered closer in order to seek and
22 locate with each other. Therefore the direction of
23 magnetism is through depth and the strength grade is
24 preferably 30. The magnetic rings are preferably
25 made from rare earth materials, such as a neodymium-
26 iron-boron NdFeB known as 'Neo' or alternatively
27 samarium-cobalt (SmCo). For other embodiments, for
28 example, those used in industrial applications, the
29 strength grade may be higher.

30

31 The Neo magnets have excellent qualities of high
32 remanent magnetisation, high coercive force and high

1 magnetic energy product and also the advantages of
2 being easy to process and a relatively high
3 performance/cost ratio. Neo magnets are especially
4 suitable for this application because of their small
5 volume, light weight and high quality. The magnetic
6 rings are available from Goudsmit magnetics UK
7 Limited of Surrey, United Kingdom or the Stanford
8 Magnets Company of Aliso Viejo, California, USA.

9
10 Thus, in use, the male part 120 of the connector 100
11 may be completely detached from the female part 150
12 and held in an operator's hand in the most
13 convenient position. In this position, the light
14 bulb 101 may be inserted into the socket 102 of the
15 male part 120 so that the live, neutral and earth
16 (if provided) terminals (not shown) of the bulb 101
17 connect with the respective terminals 127, 128 and
18 129 of the bayonet connector 102. The male part 120
19 with the attached light bulb 101 can then be raised
20 towards the female part 150. This may be done by
21 hand or, for example on a telescopic gripping pole
22 (not shown). When the male 120 and female 150 parts
23 are within the vicinity of each other the parts 120,
24 150 will automatically seek each other and form a
25 connection with each other (as shown in Fig. 3) due
26 to the magnetic attraction between the magnetic
27 rings 135, 165. The connection of the magnetic
28 rings 135, 165 also results in the male terminals
29 121-123 and the female terminals 151-153 connecting
30 with each other to form an electrical connection
31 between the male and female parts 120, 150.
32 Therefore the current can flow from a mains supply

1 (not shown) through the cable 103, through the
2 female part 150, through the connection formed
3 between the female part 150 and the male part 120,
4 through the male part 120, through the standard
5 connection 102 and into the bulb 101. The magnetic
6 rings 135, 165 therefore have two distinct
7 functions, one, to locate the male 120 and female
8 150 parts together, and two, to hold the parts 120,
9 150 together.

10

11 Thus the operation of replacing a light bulb 101 is
12 far more convenient than those of standard bayonet
13 or screw thread connections because the more
14 difficult act of locating the pins of the bayonet
15 connection of the bulb 101 into the corresponding
16 sockets or screwing 1 screw threaded bulb into the
17 socket is done with hand held components in a
18 position convenient to the operator rather than the
19 out of reach or difficult to reach position where
20 the light bulb 101 is attached and eventually hung.

21

22 Certain embodiments of the invention such as the
23 connector 100 benefit from the advantage that the
24 parts 120, 150 may connect together without being
25 rotationally aligned making the connection even
26 easier to form.

27

28 Certain embodiments of the invention such as the
29 connector 100 benefit in that the parts 120, 150 of
30 the connector 100 locating each other due to the
31 interacting magnetic fields before securing the
32 parts together. Therefore where it is difficult to

1 align the male 120 and female 150 parts (for example
2 the female part being in a difficult to reach
3 position) then the operator only has to hold the
4 male part 120 with attached light bulb 101 in the
5 vicinity of the female part 150 for the parts to
6 automatically seek, locate and form an electrical
7 connection. This is in contrast to forming a
8 bayonet connection which would require bringing the
9 bulb in line with the socket, rotationally aligning
10 the bulb with the socket, pressing the bulb and the
11 socket together and twisting the bulb and socket
12 with respect to each other before releasing; all in
13 a position which is difficult to reach. Thus the
14 use of steps, ladders or chairs in order to gain
15 access to the out of reach socket/female part 150 is
16 required less frequently for embodiments of the
17 invention due to their ease of connection when
18 compared with known sockets.

19

20 The nature of some ring magnets may make them
21 susceptible to attract each other and join offset,
22 in a non-concentric position. However certain
23 embodiments of the invention, such as the connector
24 100, benefit in that the magnetic rings cannot mis-
25 align in such a manner because the magnet 165 on the
26 female part 150 cannot access the magnet 135 due to
27 the annular rings 122, 123 unless it locates in a
28 concentric position. Thus such an advantage further
29 eases the location of the male 120 and female 150
30 parts for certain embodiments.

31

1 A second embodiment of a connector 200 in accordance
2 with the invention is shown in Figs. 4a-4d and 5a-
3 5c. The second embodiment is largely similar to the
4 first embodiment 100 and like parts will not be
5 described further. The major difference with the
6 embodiment described so far is that a male part 220
7 part of the connector 200 is in turn connected to
8 any electrical appliance (not shown) rather than a
9 light bulb 101.

10

11 Thus embodiments of the invention, such as the
12 connector 200, have the additional benefit in that
13 they can provide a socket to a mains supply (not
14 shown) for use with any type of electrical
15 appliance, for example buffers, vacuum cleaners or
16 industrial electrical appliances.

17

18 The connector 200 comprises a female part 250
19 suspended from a cable or pendent 203. The male
20 part 220 being attached to the appliance via a cable
21 205 may be offered up to the female part 250 and the
22 respective parts 220, 250 can seek and make a
23 connection as described for the first embodiment.

24

25 Whereas an earth connection for the first embodiment
26 of the invention was optional, an earth connection
27 for the second embodiment is preferred. An annular
28 earth terminal 223 of the male part is shown in
29 Figs. 4a, 4b, and is connected to an earth terminal
30 (not shown) of the appliance via a wire 226. Live
31 221 and neutral 222 terminals are also included

1 which are equivalent to those terminals 121, 122
2 described for the first embodiment.

3

4 Where an earth connection is provided for the second
5 embodiment of the invention but not for the first
6 embodiment of the invention, it is anticipated that
7 the first embodiment of the invention could have a
8 face 166 of the magnetic ring 165 of the female part
9 160 south poled whereas a face 266 of a magnetic
10 ring 265 of the female part 260 of the second
11 embodiment 200 could be North poled. Corresponding
12 magnetic rings 136, 236 on the male parts 120, 220
13 would be oppositely poled so that a male part 220
14 belonging to the second embodiment 200 and having an
15 earth connection would connect only to a female part
16 260 of the same embodiment which also has an earth
17 connection but be repelled by the female part 160
18 belonging to the first embodiment of the invention
19 which has no earth connection. Conversely a male
20 part 120 belonging to the first embodiment 100 and
21 having no earth connection would connect only to a
22 female part 160 of the same embodiment which also
23 has no earth connection but be repelled by the
24 female part 260 belonging to the second embodiment
25 of the invention which has an earth connection.
26 This would add an extra safety feature to the
27 connectors 100, 200 to ensure the respective male
28 parts 120, 220 are connected to the correct female
29 parts 160, 260 respectively.

30

31 Third and fourth embodiments of connectors 300, 400
32 in accordance with the invention are shown in Figs.

1 6a-6g, 8 and Fig. 9a-9d respectively. These
2 embodiments 300, 400 correspond with the first 100
3 and second 200 embodiments of the invention and
4 differ in the position and size of magnetic rings
5 used.

6
7 The connector 300 comprises a magnetic ring 365
8 which is embedded in a female part 350 of the
9 connector 300, as best shown in Fig. 6d. The
10 magnetic ring 365 is around 5mm in depth. A second
11 magnetic ring 335 is mounted behind a body 330 of
12 the male part 320 in order to protect the second
13 magnetic ring 335 from accidental damage or rusting
14 by the body 330 of the male part 320. The magnetic
15 ring 335 is around 10mm in depth. However, the depth
16 of the magnetic ring 335 may be increased without
17 increasing the size of annular rings 322, 323 to
18 allow a boss 363 to enter therebetween. The
19 magnetic ring 365 of the female part 350 may
20 additionally or alternatively be embedded within the
21 female part 350 for the same reasons. In such
22 embodiments the magnetic rings 365, 335 being
23 thicker than the corresponding magnetic rings of the
24 first and second embodiments, can provide a stronger
25 magnetic field and increase the distance between
26 which the parts 320, 350 of the connector 300 can
27 locate each other. Thus when the parts 320, 350 are
28 in their connected position the magnets will self-
29 align, as for previous embodiments, but will not
30 connect face to face due to an interposing portion
31 336 of the body 330 of the male part 320. Fig. 7
32 shows the connector 300 in its connected position.

1 The connector 400 also has the thicker magnetic
2 rings 435, 465. The magnetic fields created by the
3 annular magnets 435, 465 is shown in Fig. 11 and the
4 connector 400 in its connected position is shown in
5 Fig. 10 and further views are shown in Figs. 12a-12
6 & 13.

7
8 Suspending cables from the ceiling for mains power
9 supply may be safer than having the cables left
10 along the floor. Connectors in accordance with the
11 present invention would provide a straightforward
12 way in which to connect and disconnect appliances
13 from such cables. Moreover, should one trip on a
14 trailing cable the connection would break apart
15 without damage to the connection and would allow the
16 cable to give under action of the person tripping,
17 reducing the possibility of injury to that person.

18
19 Certain embodiments of the invention are useful in
20 areas where electrical power has to be made
21 conveniently and safely available but out of reach
22 for Health and Safety reasons. Certain connectors
23 in accordance with the invention may be used in
24 areas which need to be cleared quickly such as
25 hotels, schools or shopping precincts and quickly
26 connected or disconnected as required or as dictated
27 by floor movements.

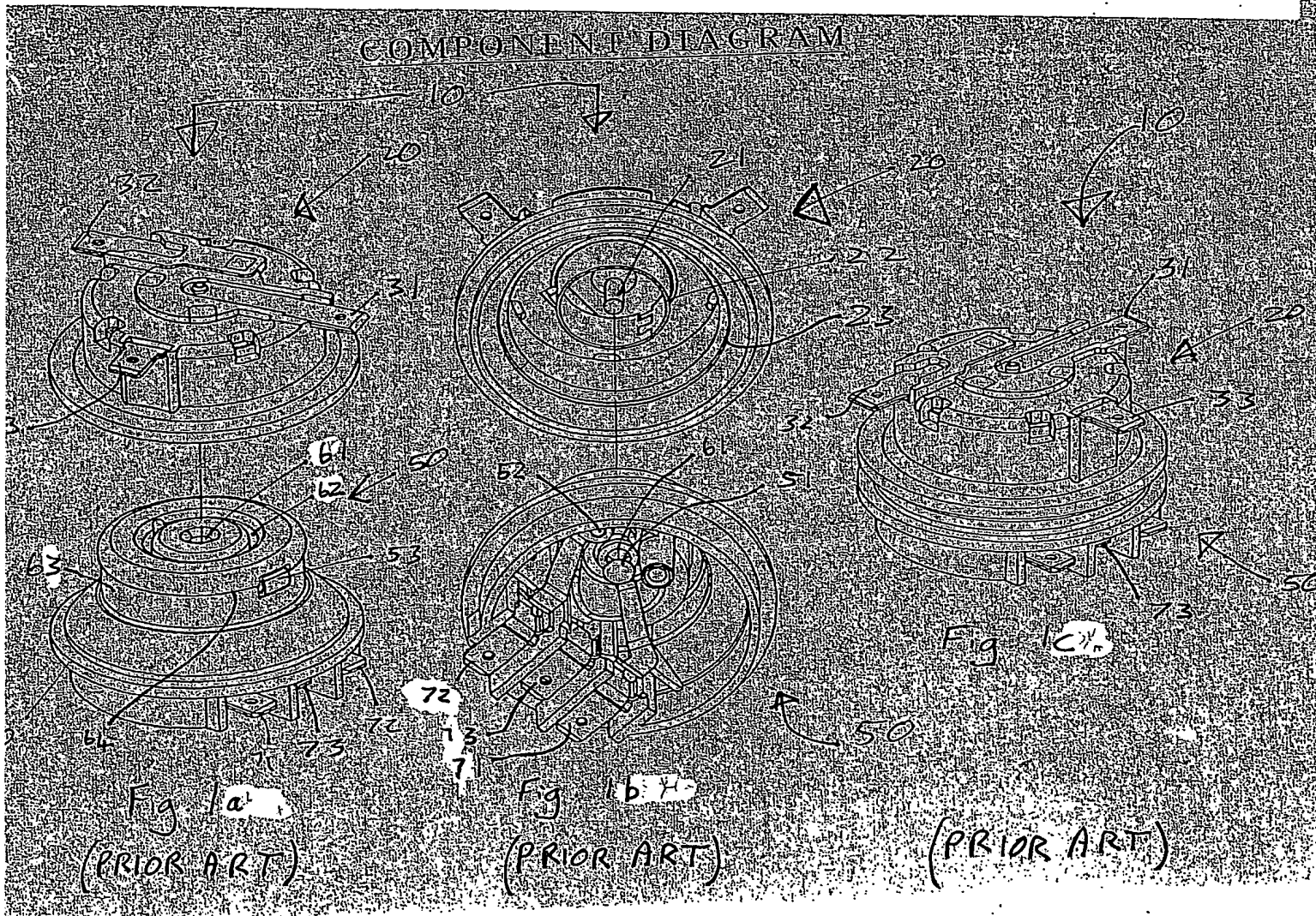
28
29 Embodiments of the invention are also suitable to be
30 used not only for mains voltages but also for
31 higher, industrial level voltages, for example of
32 around 1000Volts.

1 Thus it will be appreciated that for certain
2 embodiments of the invention such as the connector
3 300 or 400, the magnetic rings need not come into
4 direct physical connection with each other as they
5 may be protected, for example, by providing them
6 within a body of the respective parts in order to
7 protect them from accidental damage and/or from
8 rusting. They nevertheless aid the parts' connection
9 with each other due to the attraction between their
10 respective magnetic fields.

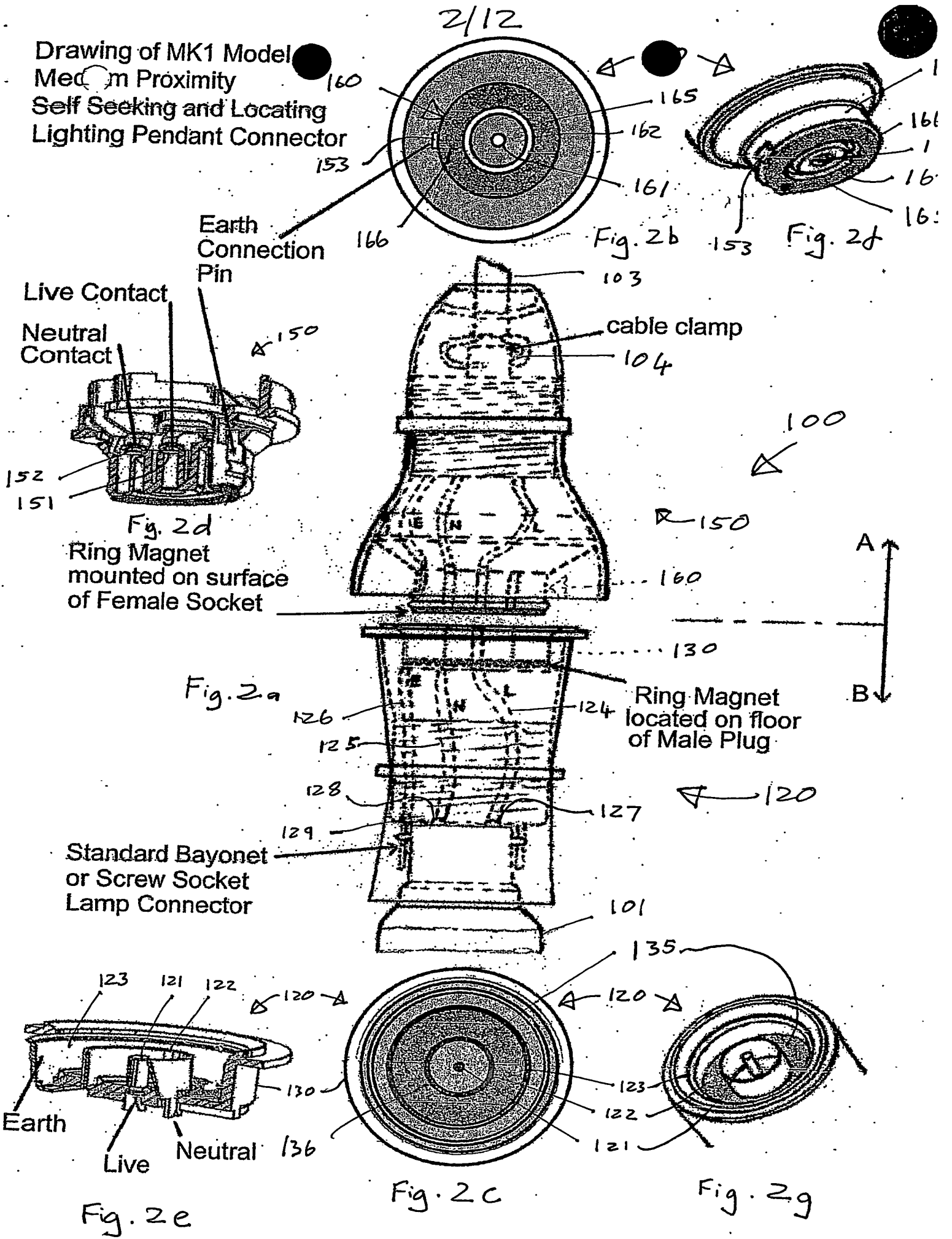
11
12 Improvements and modifications may be made without
13 departing from the scope of the invention. For
14 example, the male (or female) part may be wired to
15 any other type of standard connector such as a 2 or
16 3 pin plug socket to allow for onward connection to
17 appliances having cables with such 2 or 3 pin plugs.

1/12

COMPONENT DIAGRAM



Drawing of MK1 Model Medium Proximity Self Seeking and Locating Lighting Pendant Connector

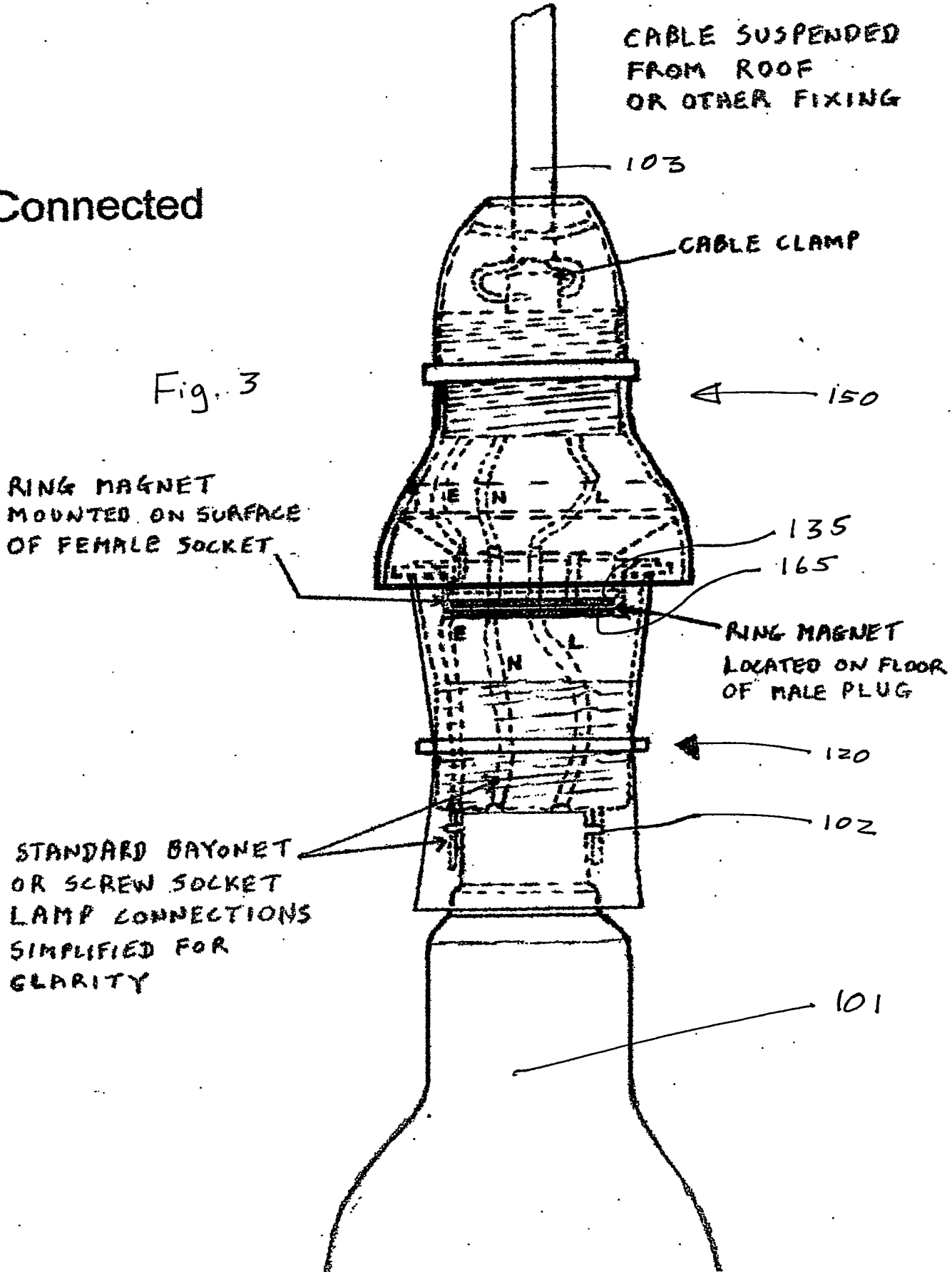


Drawing of MK1 Model
Medium Proximity
Self Seeking and Locating
Lighting Pendant Connector

3/12

Connected

Fig. 3



4/12

Design of MK1 Design Medium Proximity Self Seeking and Locating Electrical Connector

EARTH
CONNECTION
PIN

PLAN VIEW 'A'

NEUTRAL
CONNECTION
RING SLOT

Fig. 4c

C

200

266

LIVE
CONNECTION
HOLE

POWER CABLE

CABLE
CLAMP

Fig. 4a

200

250

Fig. 4b

200

EARTH
CONNECTION

FEMALE
RING MAGNET

A

B

LIVE
CONNECTION

226

MALE
RING
MAGNET

205

SECTIONAL VIEWS
ON 'C/C'

C

PLAN
VIEW 'B'

Fig. 4d

EARTH
CONNECTION RING

NEUTRAL
CONNECTION RING

LIVE
CONNECTION PIN

Drawn by G. Mcleish

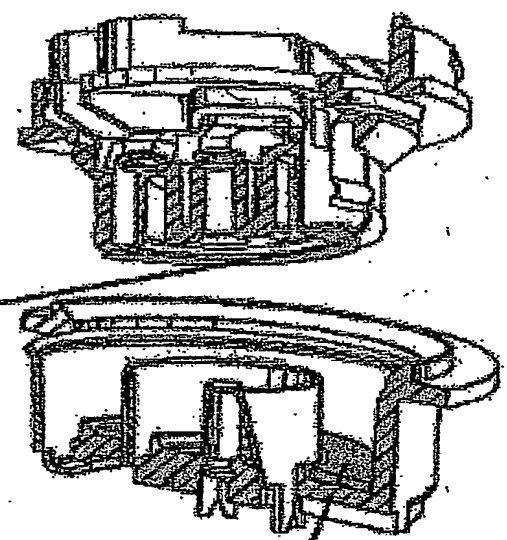
5/12

MK1 Model Connector

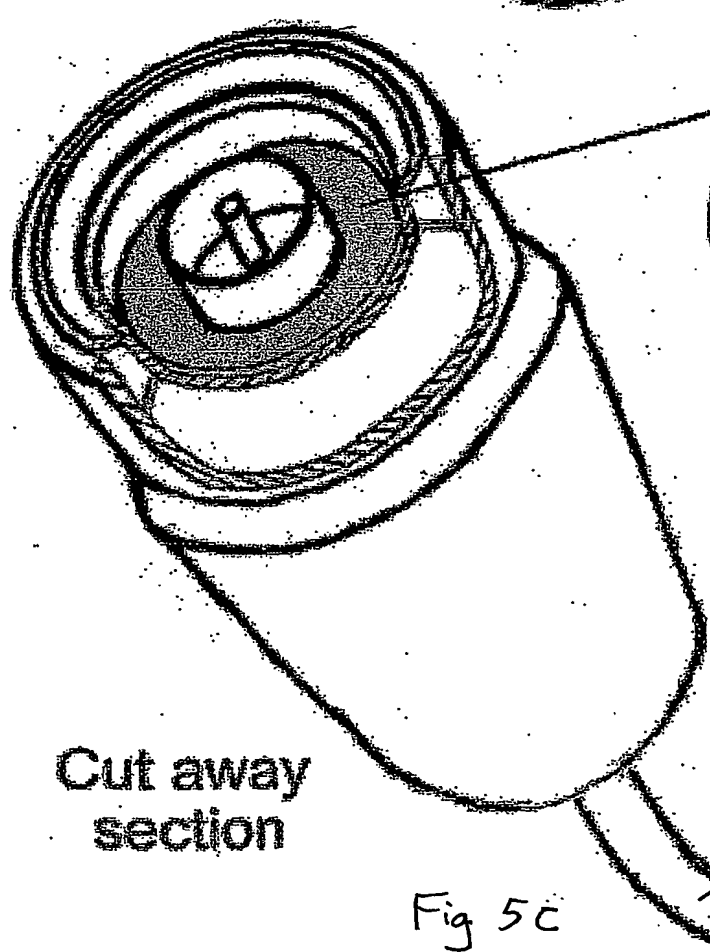
250

Fig. 5a

Female
Ring Magnet

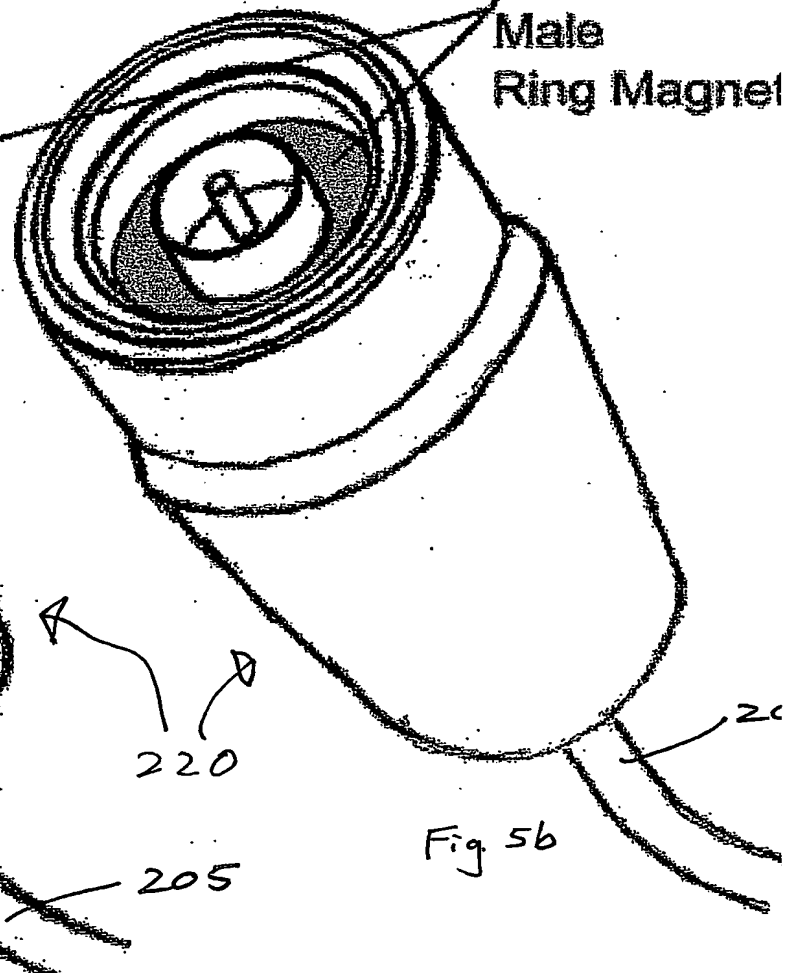


Male
Ring Magnet



Cut away
section

Fig 5c



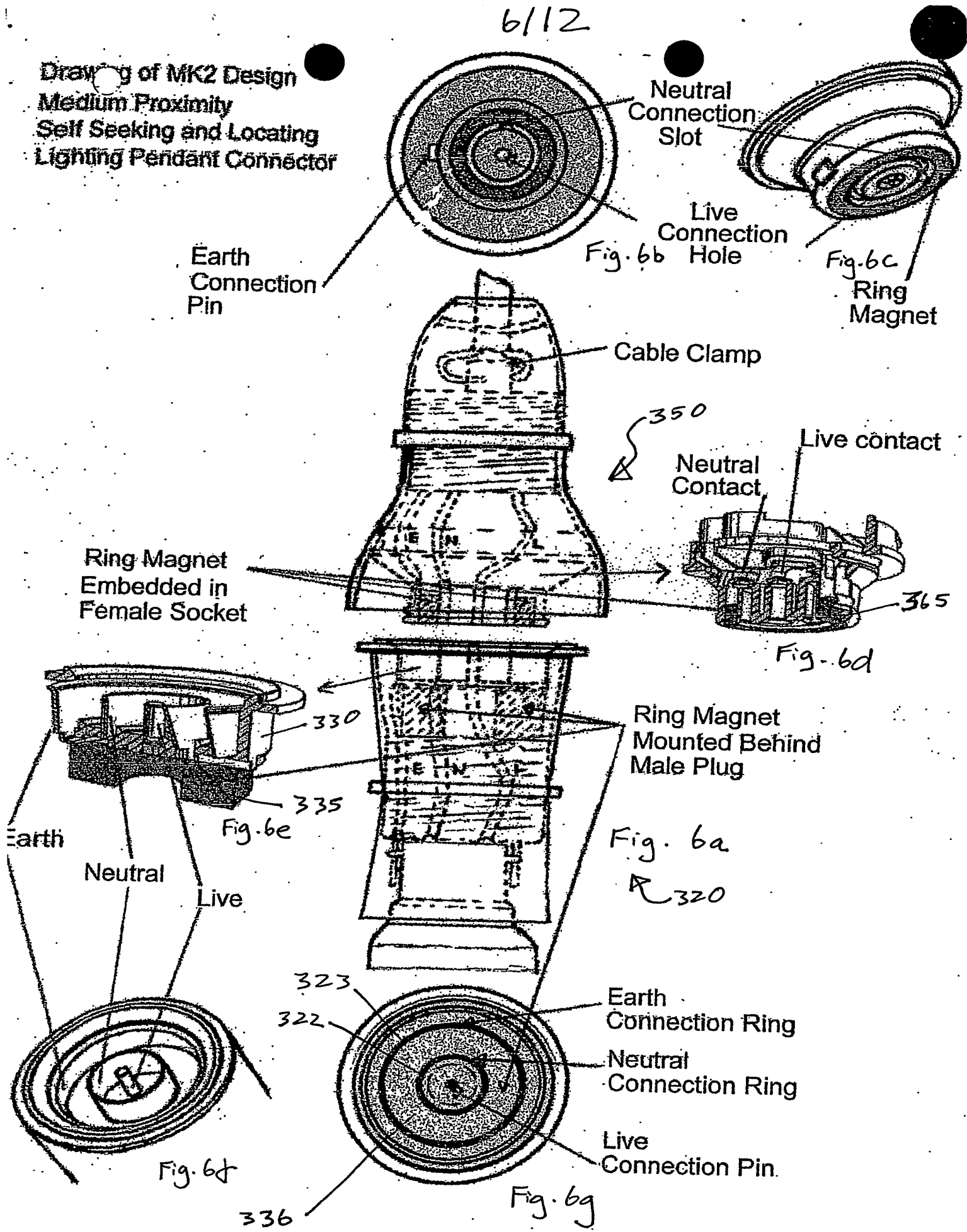
220

205

Fig 5b

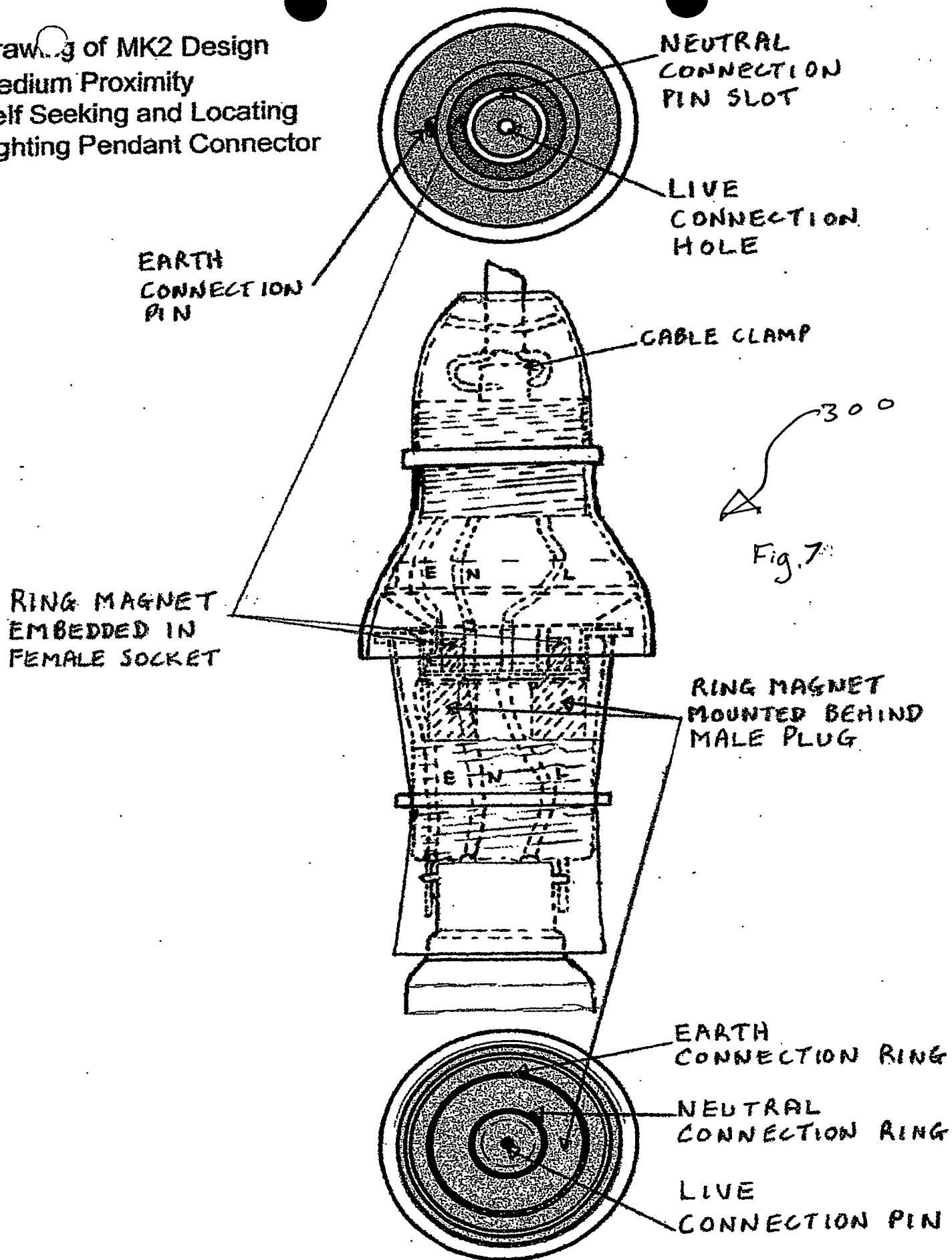
6112

Drawing of Mk2 Design
Medium Proximity
Self Seeking and Locating
Lighting Pendant Connector



7/12

Drawing of MK2 Design
Medium Proximity
Self Seeking and Locating
Lighting Pendant Connector



8/12

C

300

Standard ceiling rose
or other suspension method

350

Female Pendant Socket

Ring Magnet

Male Plug Lamholder

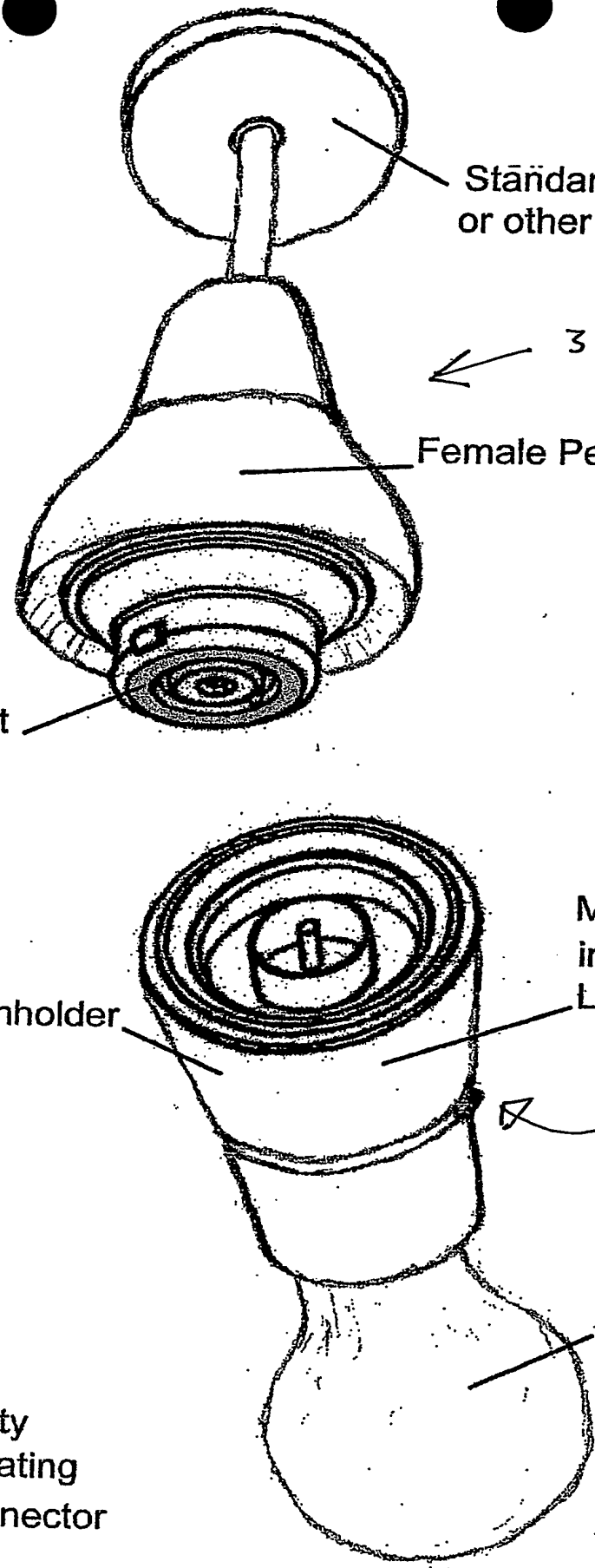
Male Ring Magnet
inside body of
Lamholder

320

Standard Bayonet
or Screw Socket
Light Bulb

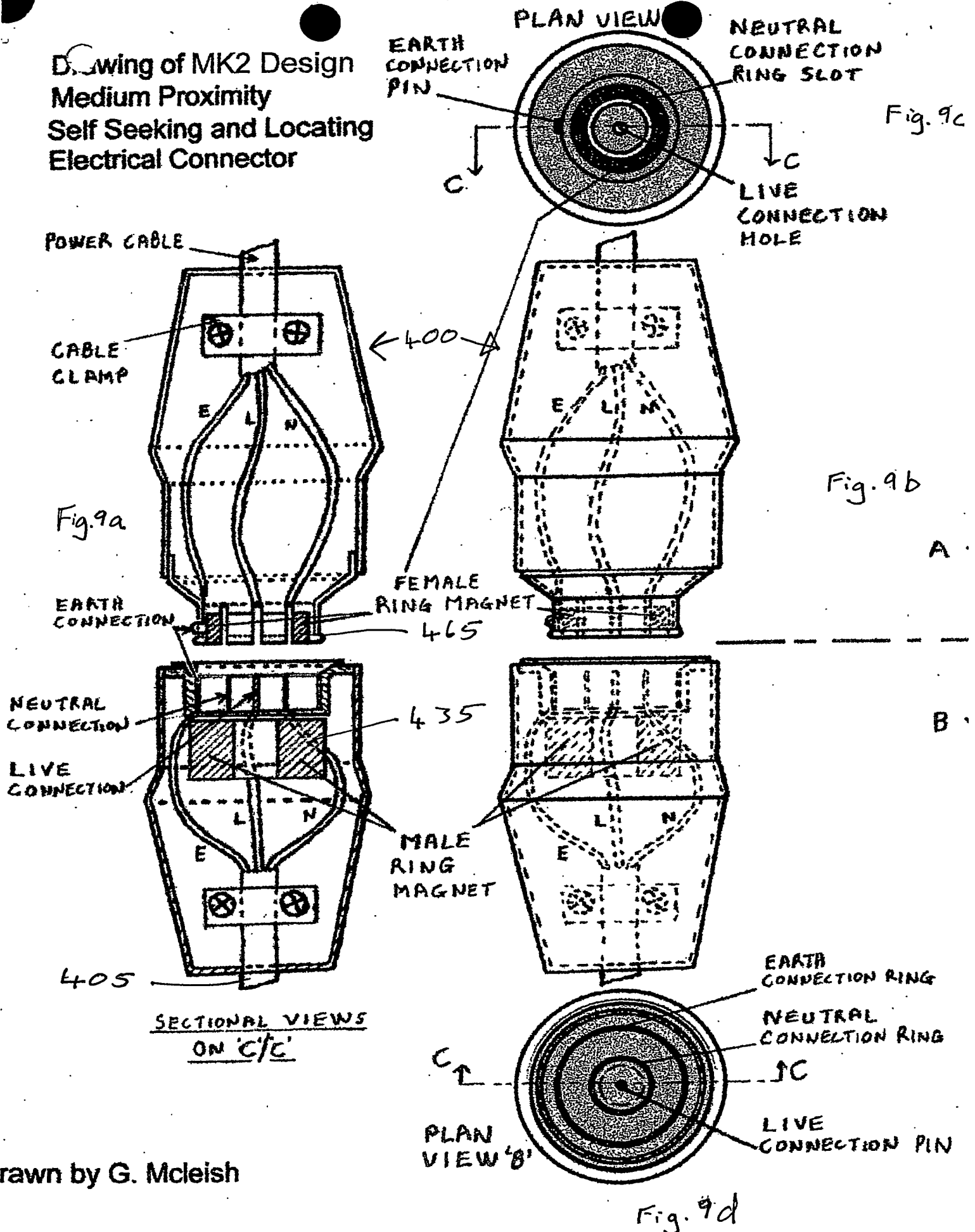
Fig. 8

Mk2 Medium Proximity
Self Seeking and Locating
Lighting Pendant Connector



9/12

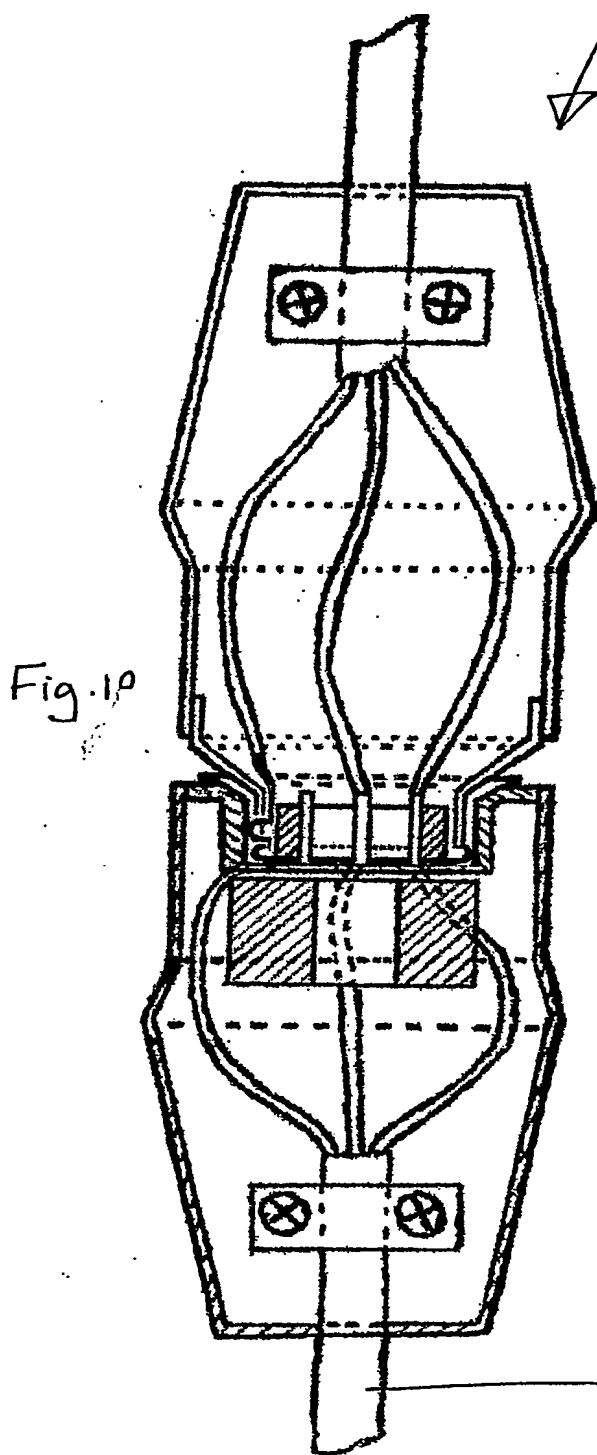
Drawing of MK2 Design Medium Proximity Self Seeking and Locating Electrical Connector



rawn by G. Mcleish

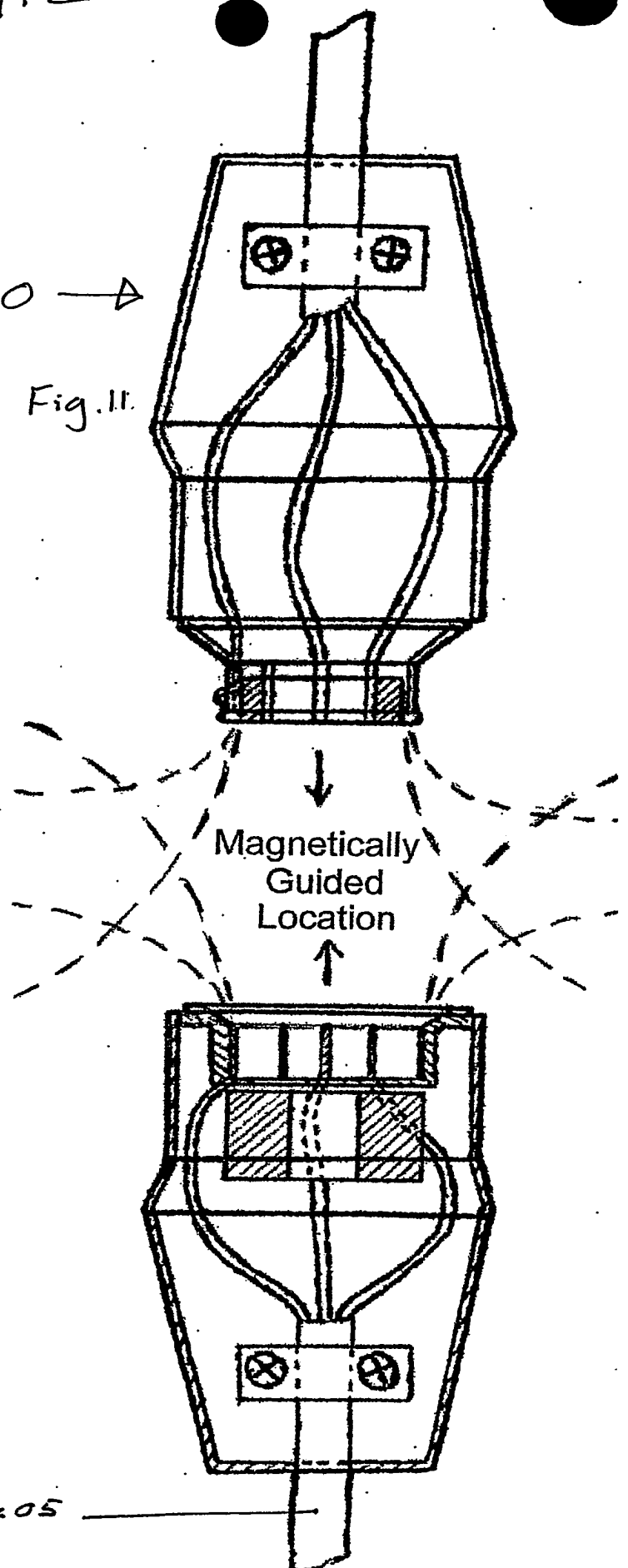
10/12

Drawing of MK2 Design
Medium Proximity
Self Seeking and Locating
Electrical Connector



400 →

Fig. 11.



11/12

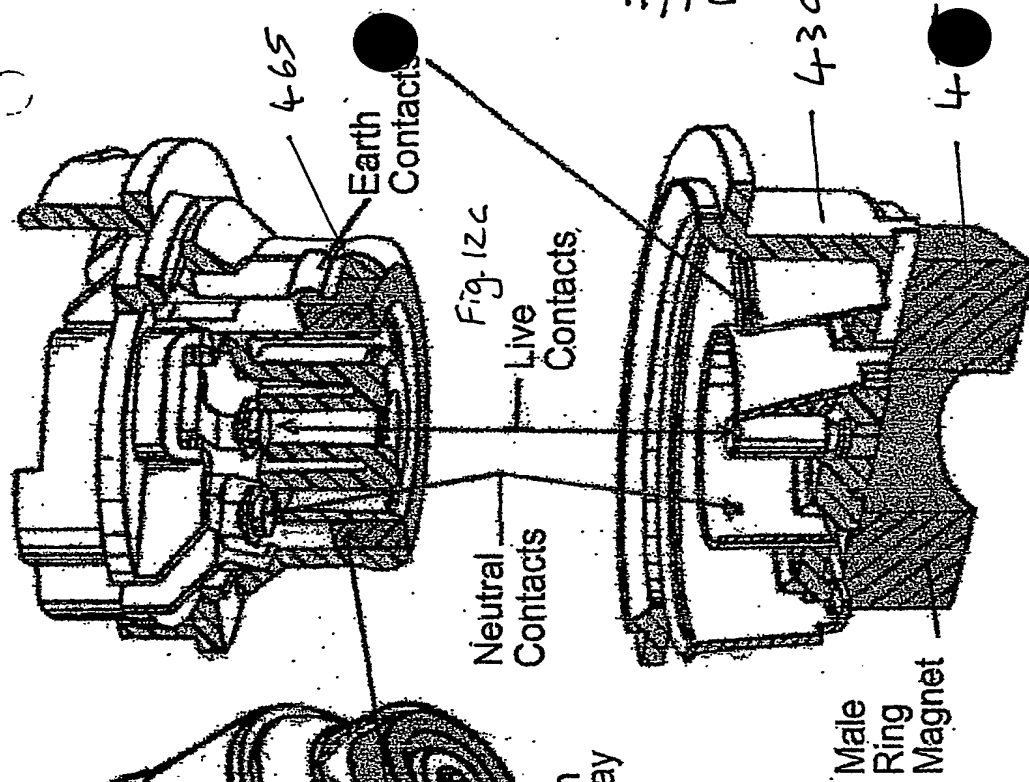
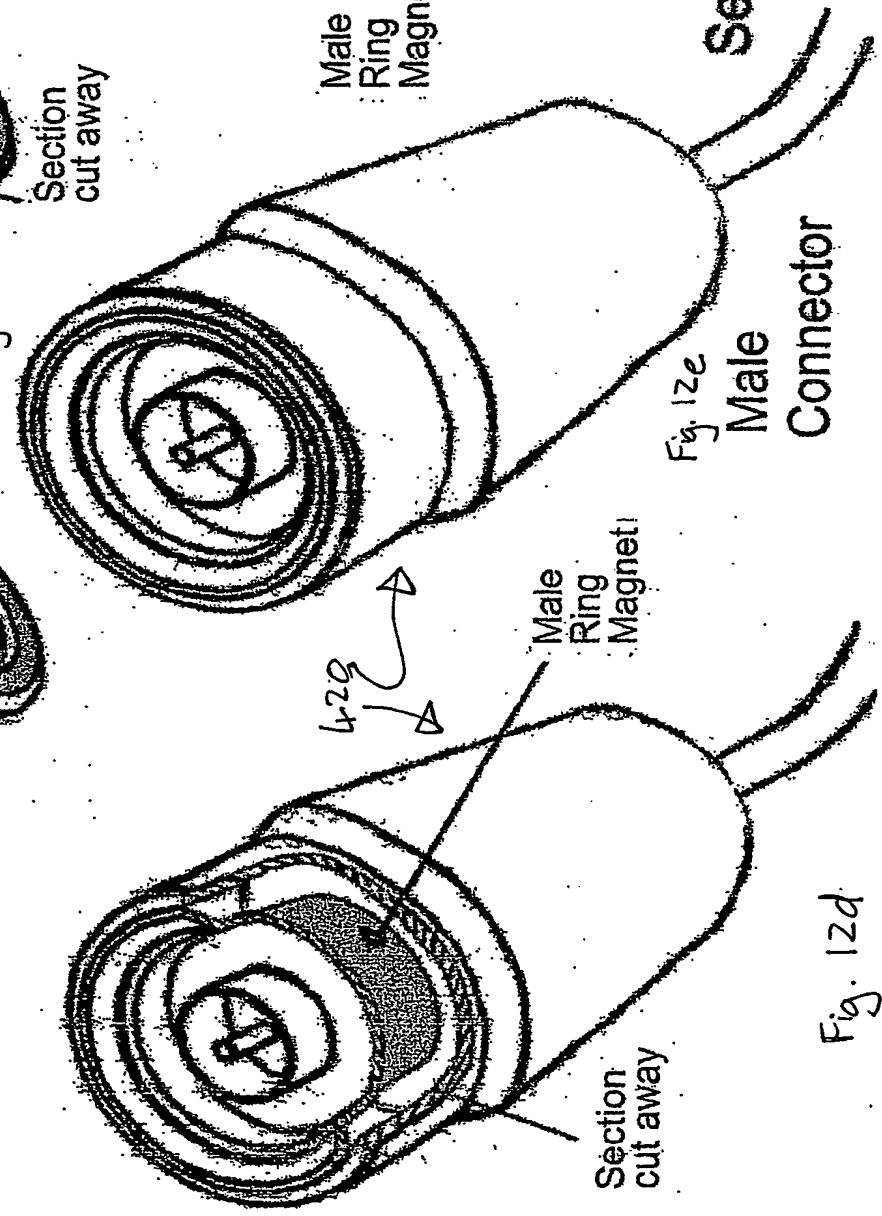
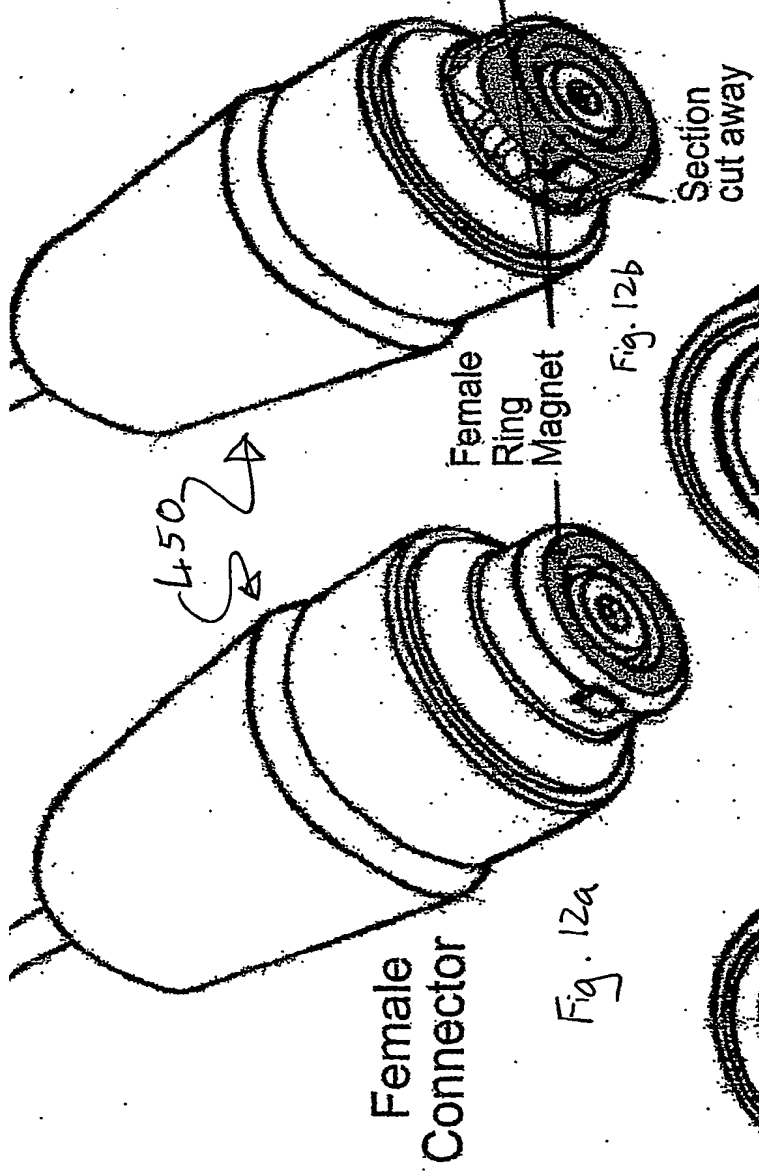


Fig. 12c.
3d's and Sections of
MK2 Medium Proximity
Self Seeking and Locating
Electrical Connector



Female
Connector

Fig. 12e
Male
Connector

Fig. 12d

12/12

Mr2 Female Socket

Ring Magnet
Embedded in
Female Socket

350/45

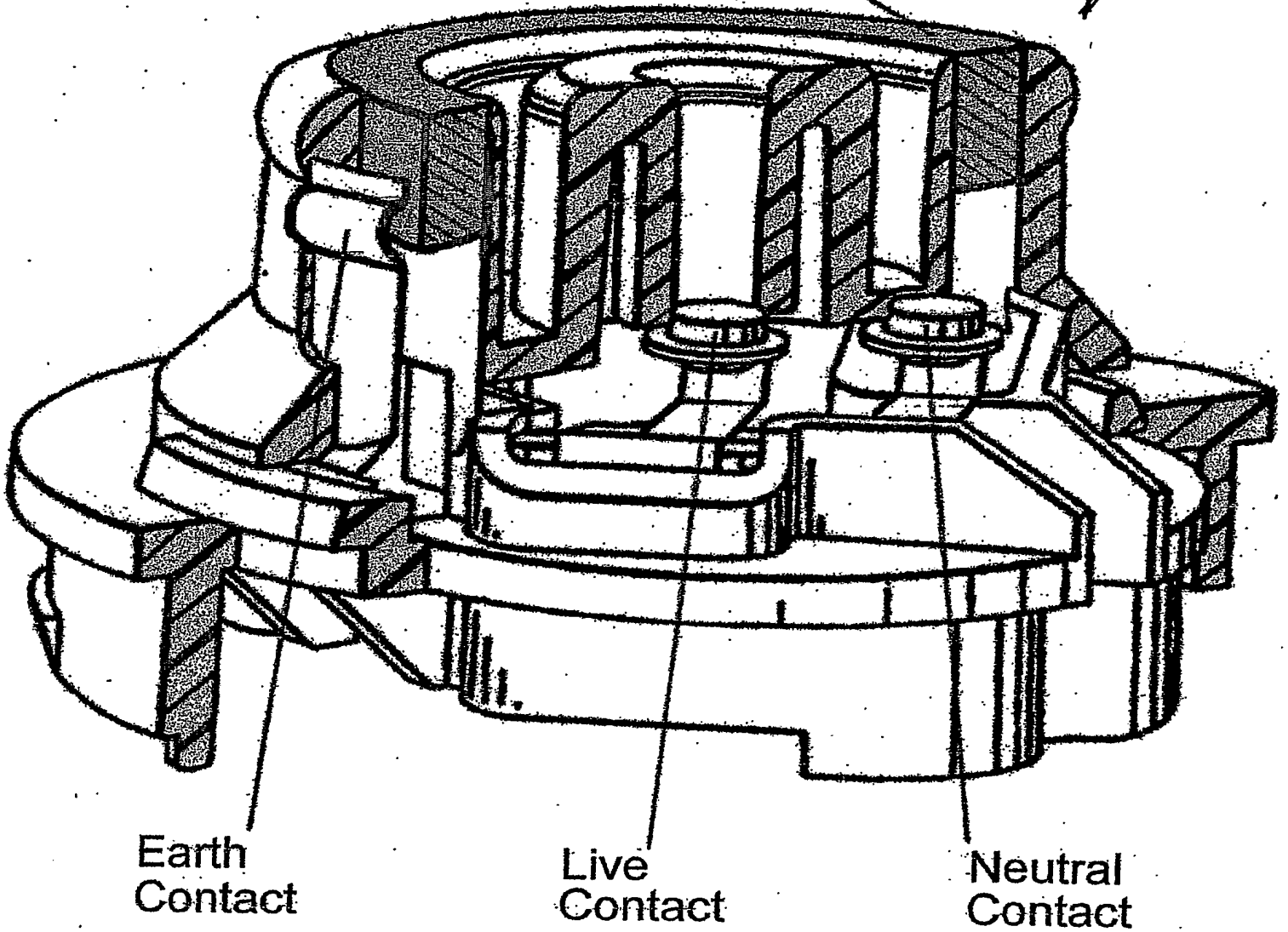


Fig. 13

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.